UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,219	10/31/2003	Young-Chai Ko	TI-36156	2776

23494 7590 03/06/2007

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER	
LEE, SIU M	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/699,219	KO ET AL.	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

Page 13, paragraph 0036, line 3, recites that the fifth path 309 at a time To+3.75*Tc. In page 14, paragraph 0038, lines 6-7, it recites the unadjusted fifth path is located at T0+3.25*Tc. Since the fifth path has not been adjusted, the time of the fifth path should be unchanged and the location of the path should be the same.

Page 18, paragraph 0048, line 3, it recites path 5 is located at To+3.75*Tc. The location of the fifth path should be the same.

Appropriate correction is required.

Drawings

2. The drawings are objected to because in figure 3, the location of path 309 is To+3.75 Tc and the location of the path 334 is at To+3.25 Tc. Since the location of the fifth path is not adjusted, the location of path 309 and 334 should be the same. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and

where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 5 recites, "adjusting each DLL to maximize sample strength"; it is unclear what sample it is referring to.

Claim 1, line 6 recites "placing samples less than a first specified threshold apart into groups", it is unclear what the specified threshold is referring to (sample strength or location of samples).

Claim 1, line 8 recites "adjusting the DLL assigned to the samples". According to claim 1, the DLL is only assigned to each path in the multipath; the DLL is not assigned to the sample.

Claim 1, line 11-12 recites "regrouping the group that are less than a second specific threshold apart", it is unclear what the specified threshold is referring to (sample strength or location of samples).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 26-29 are rejected under 35 U.S.C. 102(b) as being anticipated by He (US 5,987,016).

(1) Regarding claim 26:

He discloses a code tracking loop comprising:

a plurality of tracking fingers (fingers F1-F4 in figure 4, column 5, lines 59-60) coupled to a delay spread estimator (searcher 407 and finger manager 409 in figure 4, column 43-50), each tracking finger containing circuitry to demodulate a signal at a specified code offset (column 5, lines 59-65);

a plurality of delay lock loops (DLLs) coupled to the delay spread estimator (DLL 500-503 in figure 4), each DLL containing circuitry to provide a timing adjustment for

use in fine tuning the tracking of a signal by a tracking finger to which it is coupled (an example of the DLL 500 in figure 5, column 6, lines 57-65);

a group decision unit (controller 660 in figure 6) coupled to the plurality of DLLs (DLL 500-503), the group decision unit containing circuitry to compute tracking finger adjustment information based upon timing adjustment information provided by the DLLs to ensure that the tracking fingers are demodulating signals that are greater than a specified threshold apart (9/8 chips apart, column 8, lines 16-32); and

a combiner (adder 450 in figure 6) coupled to the plurality of tracking fingers, the combiner containing circuitry to join the demodulated signals produced by the tracking fingers into a single signal (as seen in figure 6, the adder 450 is combining all the output from the tracking fingers into a single signal).

(2) Regarding claim 27:

He discloses the code tracking loop wherein the group decision unit provides tracking adjustment information to each of the tracking fingers (controller 6660communicates via links 665-668 to DLLs 500-503 in order to monitor adjusted on-time pn-offsets resulting from DLL calculations, as well as to direct DLL operation, column 8, lines 6-9).

(3) Regarding claim 28:

He discloses the code tracking loop of wherein the tracking adjustment information is based upon timing adjustment information from each DLL in the code tracking loop (controller 6660communicates via links 665-668 to DLLs 500-503 in order

to monitor adjusted on-time pn-offsets resulting from DLL calculations, as well as to direct DLL operation, column 8, lines 6-9).

(4) Regarding claim 29:

He discloses the code tracking loop wherein the group decision unit can modify the timing adjustment information provided by the DLLs for signals that are less than the specified threshold apart (if the result of the controller comparison reveal that two or more of the on-time pn-offset values received at the same antenna are less than 9/8 pn chips apart, controller 660 identifies the DLLs which were previously tracking the multipath signals associated with the two or more on-time on-offset values and notes their previous advanced and retard pn-offset values, column 8, lines 23-32).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smolyar et al. (US 2002/0061056 A1) in view of He (US 5,987,016).

(1) Regarding claim 1:

Smolyar et al. discloses placing samples less than a first specified threshold apart into groups (group of fingers that are within a certain predefined range are put into finger block, the predefined range can be between one chip and half chip, paragraph

0081, lines 1-9); adjusting the DLL assigned to the samples in the groups so that they are greater than the first specified threshold apart (the delayed signals are used to determine which of the possible movements actually occurred and to move the sampling point according, paragraph 0085, lines 7-9) (if a finger is movement is required, then each finger need to be moved to its new location in step 14 of figure 3, paragraph 0087, lines 10); regrouping the groups that are less than a second specified threshold apart; and applying a group decision rule to the regrouped groups (redefinition of the finger blocks occurs whenever the finger movement of step 14 causes new fingers to became within range (predefined range) of each other, paragraph 0087, lines 10-12).

Smolyar et al. fails to discloses assigning a DLL to each path in the multipath and adjusting each DLL to maximize sample strength.

However, He discloses assigning a DLL to each path in the multipath (in figure 4, a DLL (500-503) is being assigned to each path in the multipath, column 5, lines 61-65) and adjusting each DLL to maximize sample strength (the comparator 530 in figure 5 computes the energy associated with despread advanced multipath ray 522 and the energy associated with despread retard multipath 524 and adjust the on-time pn-offset, column 7, lines12-25).

It is desirable to assign a DLL to each path in the multipath and adjusting each DLL to maximize sample strength because it provides the advantage of time-diversity demodulation (column 2, lines 17-18). Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to employ the teaching of He in the method of Smolyar et al. to improve the efficiency of the method.

(2) Regarding claim 2:

Smolyar et al. further discloses repeating the regrouping and applying until the groups are greater than the second specified threshold apart (according to the flow chart in figure 3, the redefine finger blocks in step 16 will loop back to step 10 and the loop will continue until no more finger need to be moved in the decision block between step 12 and step 14, paragraph 0090, lines 5-6).

(3) Regarding claim 3:

Smolyar et al. further discloses that wherein the first and the second specified thresholds are equal (the step of moving adjusts the fingers of the finger block only if the selected direction metric is the maximal direction metric and exceeds a comparison direction metric by at least a predetermined threshold, paragraph 0020).

(4) Regarding claim 4:

Smolyar et al. fails to disclose wherein the first adjusting comprises a DLL choosing to advance, retard, or make no adjustment to the path.

He further discloses wherein the first adjusting comprises a DLL choosing to advance, retard, or make no adjustment to the path (if two or more of the on-time pn-offset values received at the same antenna are less than 9/8 PN chip apart, controller 660identifies the DLLs which were previously tracking the multipath signal associated with the two or more on-time pn-offset values and notes their previous advanced and retarded on-offset values, column 8, lines 23-29).

It is desirable to have the first adjusting comprises a DLL choosing to advance, retard, or make no adjustment to the path because it will improve the frame erasure rate (column 2, lines 23-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of He in the method of Smolyar et al. to improve the reliability of the method.

(5) Regarding claim 5:

He further discloses wherein there can be multiple advance and retard adjustments (two or more on-time pn-offset values and notes their previous advanced and retard pn-offset values, column 8, lines 28-30).

(6) Regarding claim 6:

He further discloses wherein the advance adjustment is an early sample, the retard adjustment is a late sample, and no adjustment is an on-time sample of the path (the pn-offsets are measured in PN chips. The advanced pn-offset value is ½ PN chip above the on-time pn-offset value while the retard pn-offset value is ½ PN chip below the PN-offset, column 3, lines 46-49).

9. Claims 30–34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vihriala (US 2003/0186714 A1) in view of He (US 5,987,016) and Schelm et al. (US 2003/0235238 A1).

(1) Regarding claim 30:

He discloses a wireless device comprising:

a radio frequency (RF) block (receiver 405 in figure 4) coupled to a signal input, the RF block containing circuitry to filter and amplify a signal provided by the signal input (front end processing such as filtering and frequency down-converting incoming signal is performed by well known method and circuits at filter block 405, column 5, lines 23-26);

a plurality of tracking fingers (fingers F1-F4 in figure 4, column 5, lines 59-60) coupled to a delay spread estimator (searcher 407 and finger manager 409 in figure 4, column 43-50), each tracking finger containing circuitry to demodulate a signal at a specified code offset (column 5, lines 59-65);

a plurality of delay lock loops (DLLs) coupled to the delay spread estimator (DLL 500-503 in figure 4), each DLL containing circuitry to provide a timing adjustment for use in fine tuning the tracking of a signal by a tracking finger to which it is coupled (an example of the DLL 500 in figure 5, column 6, lines 57-65);

a group decision unit (controller 660 in figure 6) coupled to the plurality of DLLs (DLL 500-503), the group decision unit containing circuitry to compute tracking finger adjustment information based upon timing adjustment information provided by the DLLs to ensure that the tracking fingers are demodulating signals that are greater than a specified threshold apart (9/8 chips apart, column 8, lines 16-32); and

a combiner (adder 450 in figure 6) coupled to the plurality of tracking fingers, the combiner containing circuitry to join the demodulated signals produced by the tracking fingers into a single signal (as seen in figure 6, the adder 450 is combining all the output from the tracking fingers into a single signal).

He fails to discloses:

the wireless device further comprising a demodulator and decoder coupled to the code tracking loop, the demodulator and decoder containing circuitry to extract a digital data stream from the single signal produced by the code tracking loop.

Schelm et al. discloses a wireless device further comprising a demodulator (demodulator 24 in figure 1) and decoder (decoder 26 in figure 1) coupled to the code tracking loop (both the demodulator 24 and decoder 26 are coupled to the rake receiver 22), the demodulator and decoder containing circuitry to extract a digital data stream from the single signal produced by the code tracking loop (the resultant plurality of output signals from the fingers are combined into a high quality signal 23 and then demodulated 24 and decoded 26 to generate the user data output signal 28, paragraph 0046, lines 7-10).

It is desirable for the wireless device further comprising a demodulator and decoder coupled to the code tracking loop, the demodulator and decoder containing circuitry to extract a digital data stream from the single signal produced by the code tracking loop because it permits the receiver to maintain a high level of performance (paragraph 0016, lines 4-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the demodulator and decoder of Schelm et al. in the system of He and He to improve the performance of the wireless device.

(2) Regarding claim 31 and 32:

He further discloses that the wireless device is used in a direct sequence code division multiple access (DS-CDMA) communication network that is a TIA/EIA-95 compliment network (column 3, lines 50-56).

(3) Regarding claim 33:

He fails to disclose wherein the DS-CDMA communication network is a CDMA2000 compliant network.

However, Schelm et al. discloses wherein the DS-CDMA communication network is a CDMA2000 compliant network (paragraph 0041, lines 7-14).

It is desirable wherein the DS-CDMA communication network is a CDMA2000 compliant network because it reduces the computational complexity of the receiver (paragraph 0014, lines 6-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Schelm et al. in the device of He to maintain a high level of performance of the device.

(4) Regarding claim 34:

He fails to disclose wherein the DS-CDMA communication network is a UMTS (Universal Mobile Telephony System) compliant network.

However, Schelm et al. discloses wherein the DS-CDMA communication network is a UMTS (Universal Mobile Telephony System) compliant network (paragraph 0015, lines 11-17).

It is desirable wherein the DS-CDMA communication network is a UMTS (Universal Mobile Telephony System) compliant network because it reduces the computational complexity of the receiver (paragraph 0014, lines 6-7). Therefore, it

would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Schelm et al. in the device of He to maintain a high level of performance of the device.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yang et al. (US 6,785,321 B1) discloses an apparatus and method for estimating the time of arrival of a spread spectrum signal in a wireless communication system. Kouyama (US 2004/0013218 A1) discloses a receiving device and receiving method. Razzell (US 2002/0044592 A1) discloses an early-late detection. Rosa et al. (US 6,078,611) discloses a rake receiver and finger management method for spread spectrum communication. Becker (US 6,873,826 B2) discloses a method and mobile station for reporting multi-path signal based on minimum separation.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M. Lee
2/26/2007

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER